REMARKS

Applicants have amended Claims 1 and 2 and added new Claims 4-7 . Support for the amendment can be found generally throughout the text, specifically at page 5, line 25; page 6, lines 6 -8, 16-19 and 21-25, see also, Examples 2 and 4 and Tables 4 and 7. Applicants respectfully submit that no new matter has been added by the present amendment.

I. Rejection under 35 U.S.C. §103(a)

Claims 1-3 were rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 945482 or GB 1342889. Applicants respectfully traverse these ground of amendments and submit that niether EP 945482 or GB 1342889 render the present invention obvious.

Applicants respectfully submit that "in order to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claims limitations. The teachings or suggestions to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure." See MPEP § 2142, citing In re Vaeck, 947 F.2d 488, 20 USPQ 2d. 1438 (Fed. Cir. 1991).

The issue of motivation is properly addressed in terms of one of ordinary skill in the art who has not had access to Applicant's Specification. As set forth by the Federal Circuit in In re Dow Chemical, 5 U.S.P.Q.2d 1529 (Fed. Cir. 1988) "the consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art". The proper standard clearly required by the Federal Circuit is that "both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure". The fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient to establish prima facie obviousness.

a. EP 945482

The present invention is directed to (a) rubbers, (b) O,O-bis-(alkyl)-dithiophosphoric acid polysulfides corresponding to the formula claimed, (c) primary and/or secondary amines corresponding to the formula claimed, wherein components (b) and (c) are in a molar ratio from (0.5 to 1.5) : 1 and are present in a total amount of from 1 to 10 parts by wt. per 100 parts by wt. of rubbers in the rubber mixes, and (d) 0.5 to 3.0 wt.-% sulfur, based on the rubber.

EP 945482 is directed toward a rubber composition for tire treads and tires, which maintain low fuel consumption properties and which have greatly improved properties, particularly on wet road surfaces at lower temperatures. See Abstract. Accordingly, the rubber composition comprises a diene-based rubber and natural rubber, aluminum hydroxide powders, silica powders and optionally vulcanizing agents.

EP 945482 does not teach or suggest the combination of component (b) and (c) as claimed in the present invention, nor does EP 945482 motivate one skilled in the art to combine component (b) and (c) as particularly claimed in the present invention. In the alternative, EP 945482 discloses a long lists of vulcanization accelerators (F) including, for example, the O,O'dialkyldithiophosphate disulfides and tetrasulfides, see page 5, line 43 to 44, and, for example the use of additional general purpose vulcanization accelerators, such as sulfene amides, see page 9, lines 30 to 34. Applicants respectfully submit there is an extensive list of different vulcanization accelerators disclosed in EP 945482, beginning at page 5, line 38 to page 9, line 23. Applicants also respectfully submit so there is absolutely no suggestion or motivation, either in the text or examples, of using the specific combination of component (b) and (c) as claimed in the present invention.

b. GB 1342889

As discussed above the present invention is directed to (a) rubbers, (b) O,O-bis-(alkyl)dithiophosphoric acid polysulfides corresponding to the formula claimed, (c) primary and/or secondary amines corresponding to the formula claimed, wherein components (b) and (c) are in a molar ratio from (0.5 to 1.5) : 1 and are present in a

total amount of from 1 to 10 parts by wt. per 100 parts by wt. of rubbers in the rubber mixes, and (d) 0.5 to 3.0 wt.-% sulfur, based on the rubber.

GB 1342889 discloses vulcanizable compositions which contain thiophosphoryl polysulfides which act as sulfur donors, see page 1, line 13, and are used to replace the sulfur in vulcanizable compositions without increasing the tendency of polyesters, which might be present as fibers in the rubber compositions as reinforcing agents, to degrade see page 1, lines 30 to 33.

Applicants submit that GB 1342889 provides no motivation to arrive at the presently claimed invention. Applicants also submit there is no disclosure or example, which discloses the combination of components (a) to (d) in accordance with the present invention. In fact in order for one skilled in the art to arrive a the present invention, the skilled person in the art would first of all have to select an embodiment wherein sulfur is only partially replaced by the thiophosphoryl polysulfides and then for this specific embodiment to select the specific vulcanization accelerator from the long list of possible vulcanization accelerators disclosed, see page 2, lines 11 to 23, in the weight ratios claimed by the present invention.

In fact, the only example in GB 1342889, which comprises components (b) and (c) in accordance with the present invention (Example 2, Table, second column: Benzthiazylsulphencyclohexylamide (CBS) and Bis(diethylthiophosphoryl)trisulphide does not contain sulfur and shows only very little improvement compared to the sulfur containing composition in column 1 of the table of Example 2 (compare "the breaking strength of PET of 9.9 versus 9.6"). Using component b) alone (see for example 4th column of Table of Example 2) shows a much better result of a breaking strength of 13.6. Therefore, the skilled person in the art had no motivation starting either from Example 2, Table, 1st column, and to use the phosphoryltrisulphide in addition or to start from the second composition (2nd column) and to add sulfur to such a composition.

Further, the object underlying the present invention was to provide vulcanizable rubber mixes, which provide high heat resistance without using relatively large amounts of crosslinking chemicals, see page 1, lines 15 to 19. GB 1342889 provides no motivation or suggest that the components as claimed in the

present invention would provide rubber mixes with high heat resistance without using relative large amounts of crosslinking chemicals. Furthermore, the present invention discloses that it is useful to provide a high crosslink density and a high proportion of short, in particular mono-sulfur bridges. Applicants submit there is no suggestion in GB 1342889 that by using the specific combination of components (b) and (c) in sulfur-containing rubber vulcanizates (a) and (d) that the crosslink density and the proportion of short sulfur bridges can be greatly increased, in particular when compared to the single use of component (b) or (c).

It is unrealistic that one skilled in the art would have started from any of the compositions of Example 2 of GB 1342889 in order to solve the problem underlying the present invention. Even if the skilled person in the art had started from Example 2, Table, second column, he would not have expected that upon addition of sulfur there would be such a great increase in density or that there would be such a great proportion of short chain sulfur bridges, in particular monosulfide bridges.

For example, the Tables in the present application in the Examples 2 and 4 of the present application (Table 4, page 10 and Table 7, page 12) show that with the same sulfur content the combined use of the combination of components b) and c) leads to an unexpectedly over proportionate synergistic increase in the density as well as of the proportion of the short chain, in particular monosulfur, bridges. This was totally unexpected for the skilled person in the art.

Moreover, even if the skilled person in the art had started from the first composition in the Table of Example 2 of GB 1342889, and had asked himself whether by replacing part of the sulfur there would be an over proportionate increase of density and the proportion of short chain, in particular monosulfate bridges, he could not foresee such a surprising result.

For example, in Example 2 of the present invention, with the use of SdiOP a S_1 proportion of 65 % is reached and with the sole use of DCBS a S_1 proportion of 0 % is reached, whereas with the combined use of the two components (in equimolar amounts) a S_1 proportion of 72 % is reached. Similarly unexpected are the effects shown in Example 4.

Furthermore, in order to solve the object of increasing the heat resistance of vulcanizates there were other options available to the skilled person in the art than increasing the density and the proportion of the short chain sulfur bridges like, for example, the crosslinking with peroxides. In other words, the skilled person in the art has first of all to select this specific way of increasing the temperature of resistance of the vulcanizates and then has to find the specific combination of components (b) and (c) in accordance with the present invention. There are no hints in any of the cited documents to this specific combination. Accordingly, Applicants request withdrawal of this ground of rejection.

Respectfully submitted,

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